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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Attorney Docket No.: 1550.36-US-02

Seghatol Confirmation No.: 1736

Application No.: 09/897,317 Examiner: Ralph A. Lewis

Filed: July 2, 2001 Group Art Unit: 3732

For: HAND-HELD MICROWAVE INTRA-ORAL DENTAL SYSTEM

APPELLANT'S BRIEF (37 CFR § 1.192)

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Sir:

Please enter this appeal brief in the above-referenced application.

I. REAL PARTY IN INTEREST (37 C.F.R. § 1.192(c)(1))

The real party in interest to the appeal on the above-referenced application is Marc Seghatol, the inventor as identified above.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 1.192(c)(2))

Appellant and his legal representatives know of no other appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. § 1.192(c)(3))

This is an appeal from the final rejection of Claims 1-6, 13, 14, and 16, which are all of the remaining claims in the application. Claims 1-6, 13, 14, and 16 stand rejected under the judicially created doctrine of obviousness-type double patenting. In addition, Claim 1 stands rejected under 35 U.S.C. § 102(b) and Claims 2-5 and 14 under § 103(a) pursuant to an advisory action mailed on April 25, 2003.

IV. STATUS OF AMENDMENTS (37 C.F.R. § 1.192(c)(4))

No amendments were made after the final office action. The Examiner considered the response after the final rejections.

V. EXAMINER'S ADVISORY ACTION

In the Examiner's Advisory Action dated April 25, 2003, the Examiner states that Claims 6, 13, and 16 would be allowable if rewritten in independent form and upon the filing of a terminal disclaimer.

Claim 6: While Applicant appreciates the allowance of Claim 6 if rewritten in independent form, it should be noted that one of the reasons that Applicant has filed this appeal is because Applicant already has a patent, U.S. Patent No. 6,254,389 (issued July 3, 2001), that claims, inter alia, a "control system including a feedback sensor such that the microwave energy is applied to the tooth to allow the feedback sensor to detect the existence of caries in the tooth," providing similar claim scope to that in dependent Claim 6. Nonetheless, it is noted that when a dependent claim is allowable except for dependence upon a rejected independent claim, the dependent claim should be allowed upon the allowance of the independent claim from which it stems. Therefore, if independent Claim 1 is allowed, Claim 6 is believed to be allowable if a Terminal Disclaimer were to be filed.

Claim 13: It is noted that when a dependent claim is allowable except for dependence upon a rejected independent claim, the dependent claim should be allowed upon the allowance of the independent claim from which it stems. As a result, if independent Claim 1 is allowed, Claim 13 is believed to be allowable if a Terminal Disclaimer were to be filed.

Claim 16: Claim 16 is already in independent form and is believed to be allowable if a Terminal Disclaimer were to be filed.

VI. SUMMARY OF INVENTION (37 C.F.R. § 1.192(c)(5))

The invention is directed to a hand-held microwave system for intra-oral dentistry that utilizes microwave energy to cure polymer materials intra-orally so as to produce dental composites having improved physical characteristics, and also utilizes microwave energy to detect the presence of and to preferentially heat caries or cavities, thereby disinfecting and therapeutically treating the caries in a potentially non-invasive manner. The antenna of a hand-held version of the intra-oral microwave system is also advantageously designed to detect the presence of and to preferentially heat caries or cavities, thereby disinfecting and therapeutically treating the caries in a potentially non-invasive manner.

VII. GROUPING OF CLAIMS (37 C.F.R. § 1.192(c)(7))

Applicant groups the claims for appeal as follows:

Group I – independent Claim 1

Group II – dependent Claims 2-3

Group III – dependent Claims 4-5

Group IV – independent Claim 14

VIII. ISSUES (37 C.F.R. § 1.192(c)(6).

1. Whether Claim 1 of applicant's invention is properly rejected as being anticipated under 35 U.S.C. § 102(b) by U.S. Patent No. 5,421,727 (issued June 6, 1995) ("Stevens et al.").

2. Whether Groups II, III, and IV of applicant's invention are properly rejected as being obvious over Stevens et al. under 35 U.S.C. § 103(a).

IX. ARGUMENT REGARDING THE EXAMINER'S REJECTION UNDER 35 U.S.C. § 102 (37 C.F.R. § 1.192(c)(8)(iii))

A. U.S. PATENT NO. 5,421,727 DOES NOT DISCLOSE EACH AND EVERY ELEMENT SET FORTH IN THE PENDING CLAIMS

"For a prior art reference to anticipate in terms of 35 U.S.C. § 102, every element of the claimed invention must be identically shown in a single reference." In re Bond, 910 F.2d 831, 832 (Fed. Cir, 1990); see also MPEP § 2131.

Claim 1 of the present invention includes "an **antenna** positioned at a distal end of the tool and configured to be selectively positioned within a mouth of a patient **adjacent at least one exterior surface of a tooth**." As disclosed and used within the present invention, an antenna includes both a positive and negative terminal.

Stevens et al. discloses an antenna device requiring application of a portion of the antenna to the interior of the tooth, *i.e.*, either the positive or negative terminal must be inside of the tooth. Each and every embodiment shown in Stevens et al. depicts a device with at least some interior antenna portion. See Stevens et al., Figures 2 and 3a. Without the portion that is applied to the interior of the tooth, the device of Stevens et al. would not be operative because there would not be a complete circuit. On the other hand, the antenna of the present invention, having both positive and negative terminals of a circuit, is used with both terminals disposed adjacent at least one exterior surface of the tooth.

In addition, Stevens et al. does not include the "microwave energy is applied at a frequency and power to preferentially heat caries" limitation that is claimed in the present invention. The Examiner states that the limitation is disclosed in Stevens et al., wherein Stevens et al. states "[t]he amount of power may be selected to slightly warm the region to enhance the efficacy of a disinfectant liquid, or to kill tissue or coagulate it in a cohesive mass, or to cause a glazing of tooth structure aimed at decreasing its permeability to fluids or microorganisms or to melt sealing material evenly in the root canal." Stevens et al., col. 3, line 64 – col. 4, line 4. The Examiner further states that Stevens et al. device is capable of operating at a variety of different levels and one certainly of heating caries.

While Stevens et al. might disclose heating the surrounding tooth material or disinfectant material placed in a tooth, the present invention claims "microwave energy is applied at a frequency and power to **preferentially heat caries**." The present invention describes the complex calculations and research required to establish the operating parameters to make the presently claimed device capable of preferentially heating caries instead of the tooth. As described in the present invention, the characteristics of enamel caries and dentin are different. Therefore, although one could move through a range of operating levels and possibly pass through those energies that heat caries, Stevens et al. does not teach or suggest any calculations to preferably do so. A person of ordinary skill, after reading Stevens et al., would not be able to make the presently claimed invention because they would have no understanding of how to configure the devices of Stevens et al. to operate within the ranges that are presently claimed.

Moreover, the uses expressly taught by Stevens et al. at col. 3, line 64 – col. 4, line 4 are much different than the use of heating caries material as disclosed in the present invention. As

such, there is no motivation to seek out any operating ranges of Stevens et al. other than the ranges taught by Stevens et al. for the uses described in their patent.

Because Stevens et al. does not contain every element of Claim 1 of the present invention, Stevens et al. does not anticipate the claim. Specifically, Stevens et al. does not contain a device having an antenna that is used on at least one exterior surface of a tooth. Furthermore, Stevens et al. does not include a system wherein the microwave energy is applied by control system at a calculated frequency and power to preferentially heat caries. As such, is it respectfully submitted that the Examiner's rejection under 35 U.S.C. §102(b) must be reversed and Claim 1 be accordingly allowed.

X. ARGUMENT REGARDING THE EXAMINER'S REJECTION UNDER 35 U.S.C. § 103 (37 C.F.R. § 1.192(c)(8)(iv))

A. THE PATENT OFFICE HAS NOT MET ITS BURDEN OF PRESENTING A *PRIMA FACIE* CASE OF OBVIOUSNESS.

"In rejecting claims under 35 U.S.C. §103, the examiner bears the initial burden of presenting a *prima facie* case of obviousness." In re Rijckaert, 9 F.3d 1531, 1532 (Fed. Cir. 1993). To establish a *prima facie* case of obviousness, three basic criteria must be met. MPEP § 2142. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Id. Second, there must be a reasonable expectation of success. Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 320 F.3d 1339, 1354 (Fed. Cir. 2003); see also MPEP § 2142. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP § 2142. If the Examiner fails to establish a *prima facie* case of obviousness, the obviousness rejection must be withdrawn as a matter of law. In re Ochiai, 71 F.3d 1565, 1569 (Fed. Cir. 1995). "If examination at the initial stage does

not produce *prima facie* case of unpatentability, then without more, the applicant is entitled to grant of the patent." In re Oeitiker, 977 F.2d 1443, 1446 (Fed. Cir. 1992).

The Examiner has rejected Claims 2-5 and 14 under 35 U.S.C. § 103(a) as being obvious in view of Stevens et al. The Examiner argues that Stevens et al. makes it clear that the power levels and frequencies can be adjusted to a variety of different levels by merely adjusting the adjustable control system, as suggested by Stevens et al, and that the adjustments would have been obvious to one of ordinary skill in the art. However, the statement does not satisfy the Examiner's burden because the Examiner is imbuing one of ordinary skill with hindsight and knowledge of the present invention. For the reasons detailed below, the Examiner has failed to meet his *prima facie* case of obviousness and therefore, it is respectfully submitted that the rejection under 35 U.S.C. § 103 be reversed and Claims 2-5, and 14 accordingly allowed.

B. THERE IS NO SUGGESTION OR MOTIVATION TO MODIFY STEVENS ET AL., EITHER IN THE REFERENCE ITSELF OR IN THE KNOWLEDGE GENERALLY AVAILABLE TO ONE OF ORDINARY SKILL IN THE ART.

There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. In re Rouffet, 149 F.3d 1350, 1357 (Fed. Cir. 1998). However, the mere fact that references can be modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680 (Fed. Cir. 1990); MPEP § 2143.01. Although a prior art device "may be capable of being modified to run the way the apparatus is claimed, there must a suggestion or motivation in the reference to do so. In re Fritch, 972 F.2d 1260 (Fed. Cir. 1992).

The Examiner neither points to any portion of Stevens et al., nor suggests any knowledge generally available to one of ordinary skill in the art, that it would have been obvious to make a

device having a controller that controls the device specifically within the presently claimed parameters, *i.e.*, to preferentially heat caries or to administer the appropriate energy to do so. The Examiner states that Stevens et al. "makes it clear that the power levels and frequencies can be adjusted to a variety of different levels" and "merely adjusting the adjustable control system as suggested by [Stevens et al.] would have been obvious to one of ordinary skill in the art." However, the cited portions of Stevens et al. merely state, "Source 50 may also include tuning adjustment for maximizing power transfer to the *particular load* represented by instrument 1 in conjunction with electrode 42 and the tissue." The Examiner has interpreted the statement in Stevens et al. too broadly because the statement provides no indication that the load is to be applied as claimed in the present invention, *i.e.*, to **preferentially heat caries.** Instead, the only "particular load" referenced by the statement in Stevens et al. is heating a disinfectant liquid to kill tissue, to glaze a tooth structure, or to melt a sealing material. Stevens et al., col. 3, line 64 – col. 4, line 4.

The present Application describes the complex calculations and research required to establish the operating parameters to make the presently claimed device capable of preferentially heating caries instead of the tooth material. See, e.g., Application, Page 6, lines 1-5.

Stevens et al. do not teach or suggest the particular limitations of Group II by merely disclosing a "tuning adjustment for maximizing power transfer to the particular load." Dependent Claim 2 claims a dental system according to Claim 1 wherein the control system controls the source of microwave energy to deliver less than 10 W to the antenna. Dependent Claim 3 claims the system according to Claim 1 wherein the control system operates the source of microwave energy at voltages in a range of between 10 and 65 V. Stevens et al. does not teach or suggest a dental system that controls the source of microwave energy to deliver less than

10 W to the antenna or that operates the source of microwave energy at voltages in a range of between 10 and 65 V.

Moreover, Stevens et al. do not teach or suggest the limitations of Group III. Dependent Claim 4 claims the system of Claim 1 wherein the control system operates the source of microwave energy at frequencies of between 1 GHz to 50 GHz and dependent Claim 5 claims the system of Claim 4 wherein the control system operates the source of microwave energy at frequencies between 14 GHz to 24 GHz. As previously discussed, there is nothing in Stevens et al. in general that discloses particular frequency ranges and, with respect to the claims of Group III there is nothing that points to these particular frequency ranges as being optimum for accomplishing the claimed objective of preferentially heating caries.

Finally, Stevens et al. does not teach or suggest the limitations of independent Claim 14. Claim 14 claims a microwave dental system wherein less than 10 W of microwave energy is delivered to the antenna at frequencies between 1 GHz to 50 GHz. Stevens et al. merely disclose a "tuning adjustment for maximizing power transfer to the particular load." Again, as previously discussed, there is nothing in Stevens et al. that teaches or suggests these levels for energy or frequencies, nor is there anything about the loads disclosed by Steven et al. from which a person of ordinary skill in the art would make any conclusions as to the desirability of operating the dental system in the ranges as claimed in Group IV.

Therefore, although the Examiner points to a portion of Stevens et al. about a "tuning adjustment for maximizing power transfer to the particular load," the Examiner has failed to provide any suggestion or motivation, either in the reference itself or in the knowledge generally available to one of ordinary skill in the art, to modify Stevens et al. so as to arrive at the claimed limitations of either Groups II, III, or IV. Because the Examiner relies solely on Stevens et al.,

the Examiner has not provided any additional patents to combine with Stevens et al. to prove a *prima facie* case of obviousness. Thus, the entire rejection for obviousness must fall.

C. THERE IS NO REASONABLE EXPECTATION OF SUCCESS.

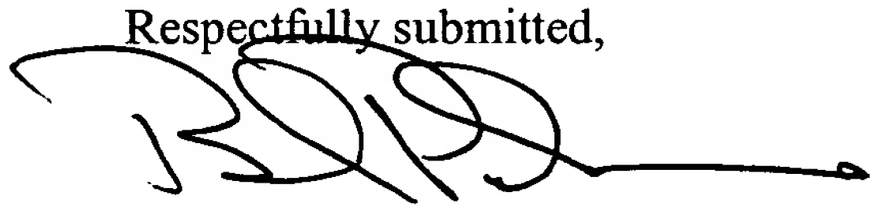
A showing of obviousness requires a motivation or suggestion to combine or modify prior art references, coupled with a reasonable expectation of success. Boehringer, 320 F.3d at 1354 (Fed. Cir. 2003). The prior art can be modified to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. In re Merck & Co., Inc., 800 F.2d 1091 (Fed. Cir. 1986).

Even if there were some suggestion to modify Stevens et al. in accordance with the claimed invention, the Examiner fails to show that a person of ordinary skill in the art would have a reasonable expectation of success in heating tooth caries by modifying Stevens et al. This is highlighted by the fact that the Examiner fails to show that a person of ordinary skill in the art, after modifying Stevens et al., could heat tooth caries at all.

D. CONCLUSION

The primary and only reference that the Examiner relies upon in rejecting the claims at issue in the present invention is U.S. Patent No. 5,421,727. However, Stevens et al. has a major flaw as a prior art reference – it does not contain all of the elements of the claims at issue. Therefore, a rejection under 35 U.S.C. 102(b) is especially inappropriate. Moreover, because the Examiner has failed to establish a *prima facie* case of obviousness for numerous reasons, a rejection under 35 U.S.C. 103(a) is also misplaced. As a result, it is respectfully submitted that the Examiner's rejections of Claims 1-6, 13, 14, and 16 of the present Application are reversed.

Respectfully submitted,



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IX. APPENDIX (37 C.F.R. § 1.192(c)(9))

The claims involved in this appeal are provided below.

1. A microwave dental system comprising:

a hand-held dental tool including:

an antenna positioned at a distal end of the tool and configured to be selectively positioned within a mouth of a patient adjacent at least one exterior surface of a tooth; and

a waveguide connected to the antenna;

a source of microwave energy operably coupled to the waveguide,

including a control system for controlling delivery of microwave energy to the waveguide such that the dental tool delivers microwave energy to the at least one exterior surface of the tooth and the microwave energy is applied at a frequency and power to preferentially heat caries.

2. The microwave dental system of claim 1 wherein control system controls the source of microwave energy to deliver less than 10 W to the antenna.

3. The system of claim 1 wherein the control system operates the source of microwave energy at voltages in a range of between 10 and 65 V.

4. The system of claim 1 wherein the control system operates the source of microwave energy at frequencies of between 1 GHz to 50 GHz.

5. The system of claim 4 wherein the control system operates the source of microwave energy at frequencies between 14 GHz to 24 GHz.

6. The system of claim 1 wherein the control system includes a feedback sensor and the microwave energy is applied to allow the feedback sensor to detect caries.

13. The system of claim 1 wherein the antenna further includes an antenna choke made of microwave absorbing materials.

14. A microwave dental system comprising:

a hand-held dental tool including:

an antenna positioned at a distal end of the tool and configured to be selectively positioned within a mouth of a patient adjacent at least one tooth; and

a waveguide connected to the antenna;

a source of microwave energy operably coupled to the waveguide, including a control system for controlling delivery of microwave energy to the waveguide such that less than 10 W of microwave energy is delivered to the antenna at frequencies between 1 GHz to 50 GHz.

16. A microwave dental system comprising:

a hand-held dental tool including:

an antenna positioned at a distal end of the tool and configured to be selectively positioned within a mouth of a patient adjacent at least one tooth, the antenna including an

antenna choke to restrict transmission of microwave energy to surrounding tissue; and a waveguide connected to the antenna;

a source of microwave energy operably coupled to the waveguide, including a control system for controlling delivery of microwave energy to the waveguide.

AF/3736

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TRANSMITTAL OF APPELLANT'S BRIEF (37 CFR § 1.192)

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Sir:

Transmitted herewith in triplicate is the Appeal Brief in this application with respect to the Notice of Appeal mailed on June 10, 2003.

This application was filed on behalf of a small entity. The Verified Statement of such status was filed in the parent application on September 20, 1999.

Pursuant to 37 CFR § 1.17(c), the fee for filing the Appeal Brief is $160.00. A check in the amount of $160.00 is enclosed.

CERTIFICATE OF MAILING

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